4.9 NOISE

Noise analysis conducted for the SR-22/West Orange County Connection can be found in the *Traffic Noise Impact Technical Report* and *Traffic Noise Impact Technical Report Reduced Build Alternative Addendum*, Parsons Brinckerhoff, December 2000 (under separate cover).

4.9.1 Federal and State Policies and Procedures

Under NEPA, noise impacts and measures to mitigate adverse impacts must be identified, including the identification of impacts for which no or only partial noise abatement/mitigation is possible. Under FHWA's traffic noise abatement requirements, traffic noise impacts must be considered for abatement when the predicted noise levels would "approach or exceed" the agency's noise abatement criteria (NAC) (Table 4.9-1) or when the predicted noise levels would substantially exceed existing noise levels and it is both reasonable and feasible to provide noise abatement. The representative noise-sensitive land uses used in the SR-22/West Orange County Connection noise analysis are classified as activity categories B, C, and E.

Table 4.9-1
FHWA NOISE ABATEMENT CRITERIA (NAC)

Activity Category	Leq(h) for Noisiest Traffic Hour (dBA)	Description of Activity
A	57 (Exterior)	Land on which serenity and quiet are of extraordinary significance and serve an important public need; and where the preservation of those qualities is essential if the area is to continue to serve its intended purposes.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

The interior noise levels (activity) apply to:
(1) Indoor activities for those parcels where no exterior noise-sensitive land uses or activities have been identified, and
(2) Those situations where the exterior activities are either remote from the highway or shielded in some manner so that the exterior activities will not be affected by the noise, but the interior activities will.
Note: Leq(h) is the one-hour energy equivalent sound level.
Source: FHWA, 1994

Under CEQA, a substantial noise increase may result in a significant adverse environmental effect and, if it does, it must be mitigated or identified as a noise impact for which it is likely that no, or only partial, abatement measures are available. Specific economic, social, environmental, legal, and technological conditions may make additional noise abatement/mitigation measures infeasible.

Caltrans defines traffic noise impacts as:
- When there is a substantial noise increase, i.e., when the predicted noise levels with the project would exceed existing noise levels by 12 dBA or more, Leq(h)
- When predicted noise levels approach (come within one dBA) or exceed the NAC

If traffic noise impacts are predicted, Caltrans requires that noise abatement measures be evaluated and considered. These measures would usually include noise barriers constructed within the highway right-of-way.
If, as a result of a proposed freeway project, noise levels in classrooms of public or private elementary or secondary schools exceed 52 dBA Leq(h), Caltrans shall provide abatement to reduce classroom noise to

the criteria or below. If the classroom noise exceeds the criteria before and after the freeway project, Caltrans shall provide noise abatement to reduce classroom noise to pre-project noise levels.

4.9.2 Predicted Future Noise Level

A. NO BUILD ALTERNATIVE

No construction is proposed under the No Build Alternative other than for those future transportation projects that have been previously approved and funded for implementation by the year 2020. These are assumed to be addressed in other environmental documents. Thus, future noise levels under this alternative would be similar to the existing conditions modeled for the highest noise hour. Table 3.9-2 in Section 3.9 indicates that 61 of the 83 noise-sensitive receivers identified (not including indoor noise levels at schools) approach or exceed the NAC for the applicable activity category under the existing condition. That is, they have a highest-noise-hour noise level of 66 Leq(h) dBA or more for activity category B, or 71 Leq(h) dBA or more for activity category C, or 51 Leq(h) dBA or more for category E.

B. TSM/EXPANDED BUS SERVICE ALTERNATIVE

The TSM/Expanded Bus Service Alternative would not result in changes in traffic patterns that would place travel lanes closer to noise-sensitive receivers; thus, future noise levels under this alternative would be similar to the existing conditions modeled for the highest noise hour. Table 3.9-2 in Section 3.9 indicates that 61 of the 83 noise-sensitive receivers identified (not including indoor noise levels at schools) approach or exceed the NAC for the applicable activity category under the existing condition. That is, they have a highest-noise-hour noise level of 66 Leq(h) dBA or more for activity category B or 71 Leq(h) dBA or more for activity category C, or 51 Leq(h) dBA for category E.

C. FULL BUILD ALTERNATIVE

Under the Full Build Alternative, traffic lanes would be moved nearer to noise-sensitive receivers and the noise levels would change. In addition, a new arterial would be built in the former Pacific Electric right-of-way, where there is currently no roadway. Table 4.9-2 shows the predicted noise levels and the noise increases/decreases (where applicable) at each of the receivers. (Note: Four receivers would not exist under the Full Build Alternative because these sites represent first-row receivers that would be displaced by the roadway improvements proposed in this alternative.) As shown on this table, 72 of the 79 remaining sites modeled for the Full Build Alternative are predicted to approach or exceed the applicable NAC. (Also, see the discussion of interior noise at schools, below.) At three sites, Site 33 (Willowick Royal Mobile Home Park, Santa Ana), Site 33-A (Boyer Avenue, Santa Ana), and the Willowick Municipal Golf Course, there would be a substantial increase (12 dBA or more).

Table 4.9-2
EXISTING AND PREDICTED FUTURE NOISE LEVELS
FULL BUILD ALTERNATIVE

Site ID No.	Existing Modeled Noise Level (highest noise hour) in Leq(h), dBA	Predicted Noise Level (highest noise hour) in Leq(h), dBA	Noise Increase or Decrease	Impact Type (Note: Approaches means comes within one dBA of NAC)
1	66	66	0	Approaches/exceeds NAC (category B – 67 dBA)
1-A	65	65	0	None
A	65	67	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
1-B	61	62	+ 1	None
2	65	70	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
3	63	66	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
4	65	70	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
Blue Bell Park	67	69	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
B	67	69	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
Almond Park	68	70	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
5	67	75	+ 8 [a]	Approaches/exceeds NAC (category B – 67 dBA)
5-A	67	75	+ 8 [a]	Approaches/exceeds NAC (category B – 67 dBA)
5-B	66	76	+ 10 [a]	Approaches/exceeds NAC (category B – 67 dBA)
6	68	69	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
6-A	68	71	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
7	73	74	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
C	74	75	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
8	74	75	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
9	74	75	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
10	72	73	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
10-A	72	73	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
11	71	72	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
12	68	69	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
13	69	70	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
14	73	75	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
15	70	72	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
D	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
15-A	65	67	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
16	68	72	+ 4	Approaches/exceeds NAC (category B – 67 dBA)
16-A	75	78	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
16-B	73	73	0	Approaches/exceeds NAC (category B – 67 dBA)
17	66	71	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
18	70	76	+ 6	Approaches/exceeds NAC (category B – 67 dBA)
18-A	70	72	+ 2	Approaches/exceeds NAC (category C – 72 dBA)
Bolsa Grande High School Playground	69	74	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
19	68	74	+ 6	Approaches/exceeds NAC (category B – 67 dBA)
19-A	72	76	+ 4	Approaches/exceeds NAC (category C – 72 dBA)
20	69	74	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
20-A	71	72	+ 1	Approaches/exceeds NAC (category C – 72 dBA)
20-B	62	63	+ 1	None
E	71	73	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
21	72	74	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
Excelsior Elem. School Playground	70	72	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
21-A	72	74	+ 2	Approaches/exceeds NAC (category B – 67 dBA)

Table 4.9-2 (continued)
EXISTING AND PREDICTED FUTURE NOISE LEVELS
FULL BUILD ALTERNATIVE

Site ID No.	Existing Modeled Noise Level (highest noise hour) in Leq(h), dBA	Predicted Noise Level (highest noise hour) in Leq(h), dBA	Noise Increase or Decrease	Impact Type (Note: Approaches means comes within one dBA of NAC)
22	68	*Not applicable; receiver would not exist under Full Build Alternative*		
22-A	65	72	+ 7 [b]	Approaches/exceeds NAC (category B – 67 dBA)
22-B	70	*Not applicable; receiver would not exist under Full Build Alternative*		
23	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
23-A	72	73	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
24	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
25	67	70	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
F	66	69	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
Eisenhower Elem. School Playground	66	69	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
26	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
27	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
27-A	73	76	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
27-B	72	75	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
G	63	73	+ 10 [b]	Approaches/exceeds NAC (category B – 67 dBA)
G-A	64	*Not applicable; receiver would not exist under Full Build Alternative*		
28	65	*Not applicable; receiver would not exist under Full Build Alternative*		
28-A	68	69	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
28-B	65	70	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
28-C	61	69	+ 8 [c]	Approaches/exceeds NAC (category B – 67 dBA)
29	67	68	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
29-A	69	70	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
29-B	63	65	+ 2	None
29-C	67	72	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
29-D	69	70	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
30	67	68	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
30-A	68	70	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
31	66	67	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
H	63	65	+ 2	None
31-A	69	70	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
31-B	73	75	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
I	70	70	0	Approaches/exceeds NAC (category B – 67 dBA)
32	67	67	0	Approaches/exceeds NAC (category B – 67 dBA)
32-A	68	68	0	Approaches/exceeds NAC (category B – 67 dBA)
J	65	65	0	None
33	51	75	+ 24 [d]	Substantial noise increase (12 dBA or more) Approaches/exceeds NAC (category B – 67 dBA)

Table 4.9-2 (continued)
EXISTING AND PREDICTED FUTURE NOISE LEVELS
FULL BUILD ALTERNATIVE

33-A	51	70	+ 19 [d]	Substantial noise increase (12 dBA or more) Approaches/exceeds NAC (category B – 67 dBA)
Willowick Muni. Golf Course	51	70	+ 19 [d]	Substantial noise increase (12 dBA or more) Approaches/exceeds NAC (category B – 67 dBA)
Spurgeon Inter-med. School Playground	56	65	+ 9 [d]	None
34	56	66	+ 10 [d]	Approaches/exceeds NAC (category B – 67 dBA)

[a] The future predicted noise levels would be much higher because the existing non-state wall that shields receiver would be removed as part of the Full Build Alternative.

[b] The future predicted noise levels would be much higher because buildings that shield receiver would be removed as part of the Full Build Alternative.

[c] The future predicted noise levels would be much higher because buildings and noise barriers that shield receiver would be removed as part of the Full Build Alternative.

[d] The future predicted noise levels would be much higher because there would be a new arterial (new noise source) within a currently vacant right-of-way.

The preliminary analysis of the interior noise levels at the interiors of school buildings nearest to the Full Build Alternative improvements is summarized in Table 4.9-3. This table shows that the school interior NAC would be exceeded at three out of six schools, Bolsa Grande High School, Jordan Intermediate School, and Excelsior Elementary School. At both Jordan Intermediate School and Excelsior Elementary School, the NAC is exceeded in the existing condition also.

Table 4.9-3
EXISTING AND PREDICTED FUTURE NOISE LEVELS AT SCHOOL BUILDING INTERIORS
FULL BUILD ALTERNATIVE

School	Existing Modeled Noise Level (highest noise hour) in Leq(h), dBA		Predicted Noise Level (highest noise hour) in Leq(h), dBA		Impact Type
	Outside*	Inside (less 10 dBA if not air-conditioned; less 20 dBA if air-conditioned)	Outside*	Inside (less 10 dBA if not air-conditioned; less 20 dBA if air-conditioned)	(Note: Approaches means comes within one dBA of NAC)
Bolsa Grande High School Bldg. Interior (not air-conditioned)	60	50	65	55	Approaches/exceeds NAC (category E – 52 dBA)
Jordan Intermed. School Bldg. Interior (not air-conditioned)	69	59	71	61	Approaches/exceeds NAC (category E – 52 dBA)
Excelsior Elem. School Bldg. Interior (not air-conditioned)	66	56	68	58	Approaches/exceeds NAC (category E – 52 dBA)
Eisenhower Elem. School Bldg. Interior (air-conditioned)	67	47	70	50	None
Fairhaven Elem. School Bldg. Interior (air-conditioned)	69	49	70	50	None
Spurgeon Inter-med. School Bldg. Interior (air-conditioned)	< 63	< 43	63	43	None

* Noise level at building exterior

D. REDUCED BUILD ALTERNATIVE

Under the Reduced Build Alternative, traffic lanes would be moved nearer to noise-sensitive receivers and the noise levels would change. Table 4.9-4 shows the predicted noise levels and the noise increases/decreases (where applicable) at each of the receivers. (Note: Fourteen receivers and two interior modeling locations for schools lie outside the project limits for the Reduced Build Alternative and are not applicable to this alternative.) As shown on this table, 65 of the remaining 69 sites are predicted to approach or exceed the applicable NAC.

The preliminary analysis of the interior noise levels at the interiors of school buildings nearest to the Reduced Build Alternative improvements is summarized in Table 4.9-5. This table shows that the school interior NAC would be exceeded at three out of four schools within the Reduced Build Alternative study area, Bolsa Grande High School, Jordan Intermediate School, and Excelsior Elementary School. At both Jordan Intermediate School and Excelsior Elementary School, the NAC is exceeded in the existing condition also.

Table 4.9-4
EXISTING AND PREDICTED FUTURE NOISE LEVELS
REDUCED BUILD ALTERNATIVE

Site ID No.	Existing Modeled Noise Level (highest noise hour) in Leq(h), dBA	Predicted Noise Level (highest noise hour) in Leq(h), dBA	Noise Increase or Decrease	Impact Type (Note: Approaches means comes within one dBA of NAC)
1	66	66	0	Approaches/exceeds NAC (category B – 67 dBA)
1-A	65	65	0	None
A	65	67	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
1-B	61	62	+ 1	None
2	65	70	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
3	63	66	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
4	65	70	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
Blue Bell Park	67	69	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
B	67	69	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
Almond Park	68	70	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
5	67	75	+ 8 [a]	Approaches/exceeds NAC (category B – 67 dBA)
5-A	67	75	+ 8 [a]	Approaches/exceeds NAC (category B – 67 dBA)
5-B	66	76	+ 10 [a]	Approaches/exceeds NAC (category B – 67 dBA)
6	68	69	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
6-A	68	71	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
7	73	74	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
C	74	75	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
8	74	75	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
9	74	75	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
10	72	73	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
10-A	72	73	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
11	71	72	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
12	68	69	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
13	69	70	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
14	73	75	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
15	70	72	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
D	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
15-A	65	67	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
16	68	72	+ 4	Approaches/exceeds NAC (category B – 67 dBA)
16-A	75	78	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
16-B	73	73	0	Approaches/exceeds NAC (category B – 67 dBA)
17	66	71	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
18	70	76	+ 6	Approaches/exceeds NAC (category B – 67 dBA)
18-A	70	72	+ 2	Approaches/exceeds NAC (category C – 72 dBA)
Bolsa Grande High School Playground	69	74	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
19	68	74	+ 6	Approaches/exceeds NAC (category B – 67 dBA)
19-A	72	76	+ 4	Approaches/exceeds NAC (category C – 72 dBA)
20	69	74	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
20-A	71	72	+ 1	Approaches/exceeds NAC (category C – 72 dBA)
20-B	62	63	+ 1	None
E	71	73	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
21	72	74	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
Excelsior Elem. School Playground	70	72	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
21-A	72	74	+ 2	Approaches/exceeds NAC (category B – 67 dBA)

[a] The future predicted noise levels would be much higher because the existing non-state wall that shields receiver would be removed as part of the Reduced Build Alternative.

Table 4.9-4 (continued)
EXISTING AND PREDICTED FUTURE NOISE LEVELS
REDUCED BUILD ALTERNATIVE

Site ID No.	Existing Modeled Noise Level (highest noise hour) in Leq(h), dBA	Predicted Noise Level (highest noise hour) in Leq(h), dBA	Noise Increase or Decrease	Impact Type (Note: Approaches means comes within one dBA of NAC)
22	68	69	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
22-A	65	67	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
22-B	70	70	0	Approaches/exceeds NAC (category B – 67 dBA)
23	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
23-A	72	73	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
24	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
25	67	70	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
F	66	69	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
Eisenhower Elem. School Playground	66	69	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
26	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
27	66	68	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
27-A	73	76	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
27-B	72	75	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
G	63	66	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
G-A	64	67	+ 3	Approaches/exceeds NAC (category B – 67 dBA)
28	65	73	+ 8 [b]	Approaches/exceeds NAC (category B – 67 dBA)
28-A	68	70	+ 2	Approaches/exceeds NAC (category B – 67 dBA)
28-B	65	69	+ 4	Approaches/exceeds NAC (category B – 67 dBA)
28-C	61	68	+ 7 [b]	Approaches/exceeds NAC (category B – 67 dBA)
29	67	68	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
29-A	69	70	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
29-B	63	64	+ 1	None
29-C	67	72	+ 5	Approaches/exceeds NAC (category B – 67 dBA)
29-D	69	70	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
30	67	68	+ 1	Approaches/exceeds NAC (category B – 67 dBA)
30-A	68	*Outside project limits for Reduced Build Alternative.*		
31	66			
H	63			
31-A	69			
31-B	73			
I	70			
32	67			
32-A	68			
J	65			
33	51			
33-A	51			
Willowick Muni. Golf Course	51			
Spurgeon Inter-med. School Playground	56			
34	56			

[b] The future predicted noise levels would be much higher because buildings and noise barriers that shield receiver would be removed as part of the Reduced Build Alternative.

Table 4.9-5
EXISTING AND PREDICTED FUTURE NOISE LEVELS AT SCHOOL BUILDING INTERIORS
REDUCED BUILD ALTERNATIVE

School	Existing Modeled Noise Level (highest noise hour) in Leq(h), dBA		Predicted Noise Level (highest noise hour) in Leq(h), dBA		Impact Type
	Outside*	Inside (less 10 dBA if not air-conditioned; less 20 dBA if air-conditioned)	Outside*	Inside (less 10 dBA if not air-conditioned; less 20 dBA if air-conditioned)	(Note: Approaches means comes within one dBA of NAC)
Bolsa Grande High School Bldg. Interior (not air-conditioned)	60	50	65	55	Approaches/exceeds NAC (category E – 52 dBA)
Jordan Intermed. School Bldg. Interior (not air-conditioned)	69	59	71	61	Approaches/exceeds NAC (category E – 52 dBA)
Excelsior Elem. School Bldg. Interior (not air-conditioned)	66	56	68	58	Approaches/exceeds NAC (category E – 52 dBA)
Eisenhower Elem. School Bldg. Interior (air-conditioned)	67	47	70	50	None
Fairhaven Elem. School Bldg. Interior (air-conditioned)	69	49	*Outside project limits for Reduced Build Alternative.*		
Spurgeon Inter-med. School Bldg. Interior (air-conditioned)	< 63	< 43			

* Noise level at building exterior

Thresholds of Significance for CEQA:

- Potential for increased noise levels in residential areas
- Potential for increased noise levels at commercial properties with outdoor use
- Potential noise impacts inside school classrooms
- Potential noise impacts from multiple reflections between parallel noise barriers

A. NO BUILD ALTERNATIVE

The No Build Alternative would have no significant impacts for the thresholds outlined above.

B. TSM/EXPANDED BUS SERVICE ALTERNATIVE

The TSM/Expanded Bus Service Alternative would not result in changes in traffic patterns that would place travel lanes closer to noise-sensitive receivers; thus, future noise levels under this alternative would be similar to the existing conditions Alternative would result in no significant impacts for the thresholds outlined above.

C. FULL BUILD ALTERNATIVE

Under the Full Build Alternative, traffic lanes would be moved nearer to noise-sensitive receivers and the noise levels would increase. These increases in noise levels are anticipated to have less than significant impacts to the areas listed above. Potentially significant impacts from noise reflections between soundwalls may occur, however, further studies need to be conducted during the final design phase of the Full Build Alternative.

D. REDUCED BUILD ALTERNATIVE

Under the Reduced Build Alternative, traffic lanes would be moved nearer to noise-sensitive receivers and the noise levels would change in the areas listed above. Less than significant noise impacts are anticipated to result under this alternative.

4.9.3 Construction Noise

Construction noise represents a short-term impact on the noise environment. The duration and level of construction noise is variable, depending upon the following phases of activity:

- Ground-clearing, demolition, and removal of existing structures, trees, rocks, and soil
- Excavation
- Placement of foundations and roadbeds
- Erection of structures, including bridges and retaining walls
- Finishing, including filling, grading, paving, landscaping, and cleanup operations

Typically, the first two phases, ground-clearing and excavation, generate the highest noise levels. Noise generated by construction equipment, including trucks, graders, bulldozers, concrete mixers, and portable generators, can reach levels in the range of 67 to 98 dBA at 15 meters (50 feet). The EPA's Noise Control Program (40 CFR 204) regulates some construction equipment noise emissions. Presently, air compressors are the only equipment under regulation.

A. NO BUILD ALTERNATIVE

No construction is proposed under the No Build Alternative other than for those future transportation projects that have been previously approved and funded for implementation by the year 2020. These are assumed to be addressed in other environmental documents. Thus, there would not be additional construction noise impacts.

B. TSM/EXPANDED BUS SERVICE ALTERNATIVE

The TSM/Expanded Bus Service Alternative would largely consist of operational and system improvements, with only minor construction. Thus, there would be no construction noise impacts.

C. FULL BUILD ALTERNATIVE

Noise levels for equipment that might be used for the excavation and construction of the Full Build Alternative are listed in Table 4.9-6. The levels listed are at 15 meters (50 feet) from the noise source. For each doubling of distance, the noise decreases by approximately six dBA. So at 30 meters (100 feet), the noise levels would be about six dBA less than shown. Similarly, at 60 meters (200 feet), the noise levels would be twelve dBA less than shown. Intervening structures or topography can act as a sound barrier and also reduce noise levels.

Table 4.9-6
CONSTRUCTION EQUIPMENT NOISE LEVELS

Type of Equipment	Maximum Level, dBA

	at 15 meters (50 feet)
Scrapers	89
Bulldozers	85
Heavy Trucks	88
Backhoe	80
Pneumatic Tools	85
Concrete Pump	82

Source: Federal Transit Administration, 1995

D. REDUCED BUILD ALTERNATIVE

Noise levels for equipment that might be used for the excavation and construction of the Reduced Build Alternative are listed in Table 4.9-6.

Thresholds of Significance for CEQA:

- Construction noise

A. NO BUILD ALTERNATIVE

The No Build Alternative would have no significant construction related impacts.

B. TSM/EXPANDED BUS SERVICE ALTERNATIVE

The TSM/Expanded Bus Service Alternative would largely consist of operational and system improvements, with only minor construction. It is anticipated that there would be no significant construction noise impacts for this alternative.

C. FULL BUILD ALTERNATIVE

Equipment that might be used for the excavation and construction of the Full Build Alternative would have potentially significant short term noise impacts to surrounding areas.

D. REDUCED BUILD ALTERNATIVE

Equipment that might be used for the excavation and construction of the Reduced Build Alternative would have potentially significant short term noise impacts to surrounding areas.

4.9.4 Noise Abatement/Mitigation

A. SUMMARY OF PRELIMINARY NOISE ABATEMENT ANALYSIS

Under the Caltrans' *Traffic Noise Analysis Protocol* (October 1998), noise abatement measures must be considered when traffic noise impacts have been identified. Preliminary noise abatement design includes acoustical considerations such as noise barrier heights, lengths, and location. A minimum of a five-dBA reduction in noise levels must be achieved at the impacted receiver for the proposed noise abatement measure to be considered feasible. Different noise barrier heights are considered when assessing feasibility. Greater noise reductions are encouraged if they can be reasonably achieved. Feasibility may also be affected by physical constraints, such as topography, driveways, ramps, cross streets, other noise sources in the area, and safety considerations.

Whether a noise barrier wall is *reasonable* is a more complicated determination that includes the following considerations:

1. Cost of the abatement
2. Absolute noise levels
3. Change in noise levels
4. Noise abatement benefits
5. Date of development along the highway
6. Life cycle of abatement measures
7. Environmental impacts of abatement construction
8. Social, economic, environmental, legal, and technological factors
9. Opinions of impacted residents
10. Input from the public and local agencies

The first five of these considerations were analyzed for this DEIR/EIS and the results are included in Appendix I.3, Preliminary Noise Abatement Analysis. Reasonable cost allowances are evaluated for those barriers, at various heights, that were determined to be feasible. For any of the noise barriers to be considered reasonable from a cost perspective, the *total estimated cost* of the barrier must be at or below the *total allowance* calculated for each noise barrier. The *total allowance* for each noise barrier is established by considering the total number of residences benefited multiplied by the allowance per residence, a factor that varies depending upon local conditions. A critical noise receptor is selected, which is the receiver which would have the highest predicted future traffic noise levels and represents the highest increase between existing and future build noise levels. (These cost allowance calculations are included in the *Traffic Noise Impact Technical Report* and *Traffic Noise Impact Technical Report Reduced Build Alternative Addendum*, contained in Appendix I of this document.) The *total estimated cost* of a noise barrier is based on an engineer's estimate that includes all items appropriate or necessary for the construction of the barrier, such as traffic control, drainage modification, retaining walls, etc. A summary of the results of the reasonable analysis, including the number of residence benefited from each noise barrier, is presented in Appendix I.3. As more information such as survey topographic maps become available, the reasonable allowance for each wall will be recalculated during the design phase and if the cost of any wall is not reasonable, they might be eliminated from this project. The life cycle of noise abatement (factor 6) is considered when planned future use would limit the useful life of the abatement measure to less than 15 years. Considerations 7 and 8 are analyzed throughout this DEIR/EIS, with the impacts, if any, specifically described (particularly in Sections 4.10, Parks and Recreation, and 4.13, Visual Resources). Based on this feasibility and reasonability analysis, the *Preliminary Noise Abatement Decision* has been made, which is presented in Figures 4.9-1 and 4.9-2 and Tables 4.9-5 and 4.9-7. During the public review period for the DEIR/EIS, impacted residents, the general public, and local agencies will have the opportunity to comment on the *Preliminary Noise Abatement Decision*. These opinions, which represent the last two considerations for reasonability, will be weighed in order to make the *Final Noise Abatement Decision,* which will be presented in the Final EIR/EIS.

Preliminary information on the characteristics of potential noise abatement measures (e.g., physical location, length, and height of noise barriers) is provided in the *Traffic Noise Impact Technical Report* and *Traffic Noise Impact Technical Report Reduced Build Alternative Addendum* (Appendix I) and is summarized in this section. If pertinent parameters change substantially during the final project design, the preliminary noise abatement design may be changed or eliminated from the final project design. The final design of noise barriers, if included in this project, will be based on the final project design.

Noise abatement for impacted commercial properties with outdoor use areas is considered differently. If noise barriers are feasible (that is, if they would result in a noise reduction of at least five dBA), then they may be provided if they are desired by the commercial property owners. Businesses such as automobile sales and fast-food restaurant often partially depend on freeway visibility for business, so noise barriers are not always desirable. Consultation with the property own-

ers occurs during the public review process of the DEIR/EIS and during final project design to determine whether noise barriers would be provided.

B. NO BUILD ALTERNATIVE

Although there are existing conditions (No Build Alternative conditions) that exceed the FHWA NAC, no noise abatement/mitigation is proposed for the No Build Alternative. Because the No Build Alternative does not include a build project, there would be no mechanisms in this alternative to allow construction of noise abatement. If this alternative is selected as the preferred alternative, the standard Caltrans processes for identifying, funding, and constructing noise abatement, such as the on-going Community Noise Abatement program, would apply.

C. TSM/EXPANDED BUS SERVICE ALTERNATIVE

Although there are existing conditions that exceed the FHWA NAC and these conditions would not be changed under the TSM/Expanded Bus Service Alternative, no noise abatement/mitigation is proposed. Because this alternative does not propose construction on the freeways, there would be no mechanisms in this alternative to allow construction of noise abatement. If this alternative is selected as the preferred alternative, the standard Caltrans procedures, such as the on-going Community Noise Abatement program, would apply.

D. FULL BUILD ALTERNATIVE

Traffic Noise Abatement – Preliminary Noise Abatement Decision.

NOI-FB-1. Based on the Preliminary Noise Abatement Analysis (Appendix I.3), noise barriers are proposed for the Full Build Alternative, as shown in Figure 4.9-1 (at the end of this section) and Table 4.9-7. Of the 26 noise barriers considered in the reasonability analysis, only one barrier (NB-26) was determined not to be reasonable (Table A, Appendix I.3). The remaining 25 noise barriers are the highest that are considered to be feasible and reasonable (4.9 meters [16 feet]). As shown in Table 4.9-7, each of these noise barriers would result in at least a five-dBA noise reduction at the critical receiver. The total allowance for the highest walls considered (4.7 meters [16 feet]) is $44,988,000. Because this value is less than 50 percent of the total estimated project construction cost, modification of the total allowance is not required.

Table 4.9-7
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
FULL BUILD ALTERNATIVE

Site ID No.	**Existing Modeled Noise Level** in Leq(h), dBA	**Predicted Noise Level Without Abatement** in Leq(h), dBA	**Abatement** *(Noise barriers numbers cross-reference to Figure 4.9-1)*	**Predicted Noise Level With Abatement** in Leq(h), dBA	**Noise Reduction** in dBA
1	66	66	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	66	---

1-A	65	65	**None required.** Existing 4.3-meter (14-foot) noise barrier will remain.	65	---
A	65	67	**New noise barrier (NB-1).** 4.9-meter-high (16-foot-high)	62	5
1-B	61	62	**None required.** Existing 4.3-meter (14-foot) noise barrier will remain.	62	---
2	65	70	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	70	---
3	63	66	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	66	---
4	65	70	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	70	---
Blue Bell Park	67	69	**None.** Existing 4.9- to 5.5-meter (16- to 18-foot) noise barrier is highest available.	69	---
B	67	69	**None.** Existing 4.9- to 5.5-meter (16- to 18-foot) noise barrier is highest available.	69	---
Almond Park	68	70	**None.** Existing 4.9- to 5.5-meter (16- to 18-foot) noise barrier is highest available.	70	---
5	67	75	**New noise barrier (NB-2).** 4.9-meter-high (16-foot-high)	68	7
5-A	67	75	**New noise barrier (NB-2).** 4.9-meter-high (16-foot-high)	68	7
5-B	66	76	**New noise barrier (NB-2).** 4.9-meter-high (16-foot-high)	66	10
6	68	69	**New noise barrier (NB-3).** 4.9-meter-high (16-foot-high)	64	5
6-A	68	71	**New noise barrier (NB-3).** 4.9-meter-high (16-foot-high)	65	6
7	73	74	**New noise barrier (NB-5).** 4.9-meter-high (16-foot-high)	66	8
C	74	75	**New noise barrier (NB-4).** 4.9-meter-high (16-foot-high)	66	9
8	74	75	**New noise barrier (NB-4).** 4.9-meter-high (16-foot-high)	66	9

Table 4.9-7 (continued)
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
FULL BUILD ALTERNATIVE

Site ID No.	**Existing Modeled Noise Level** in Leq(h), dBA	**Predicted Noise Level Without Abatement** in Leq(h), dBA	**Abatement** *(Noise barriers numbers cross-reference to Figure 4.9-1)*	**Predicted Noise Level With Abate-ment** in Leq(h), dBA	**Noise Reduction** in dBA
9	74	75	**New noise barrier (NB-7).** 4.9-meter-high (16-foot-high)	66	9
10	72	73	**New noise barrier (NB-6).** 4.9-meter-high (16-foot-high)	66	7
10-A	72	73	**New noise barrier (NB-6).** 4.9-meter-high (16-foot-high)	66	7
11	71	72	**New noise barrier (NB-7).** 4.9-meter-high (16-foot-high)	67	5

12	68	69	**New noise barrier (NB-8).** 4.9-meter-high (16-foot-high)	61	8
13	69	70	**New noise barrier (NB-8).** 4.9-meter-high (16-foot-high)	62	8
14	73	75	**New noise barrier (NB-9).** 4.9-meter-high (16-foot-high)	68	7
15	70	72	**New noise barrier (NB-9).** 4.9-meter-high (16-foot-high)	67	5
D	66	68	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	68	---
15-A	65	67	**New noise barrier (NB-9).** 4.9-meter-high (16-foot-high)	62	5
16	68	72	**New noise barrier (NB-10).** 4.9-meter-high (16-foot-high)	63	9
16-A	75	78	**New noise barrier (NB-9).** 4.9-meter-high (16-foot-high)	63	15
16-B	73	73	**New noise barrier (NB-9).** 4.9-meter-high (16-foot-high)	58	15
17	66	71	**New noise barrier (NB-10).** 4.9-meter-high (16-foot-high)	62	9
18	70	76	**New noise barrier (NB-11).** 4.9-meter-high (16-foot-high)	64	12
18-A	70	72	**See mitigation measure NOI-FB-2.**		
Bolsa Grande High School Playground	69	74	**New noise barrier (NB-11).** 4.9-meter-high (16-foot-high)	64	10
19	68	74	**New noise barrier (NB-11).** 4.9-meter-high (16-foot-high)	65	9
19-A	72	76	**See mitigation measure NOI-FB-2.**		
20	69	74	**New noise barrier (NB-11).** 4.9-meter-high (16-foot-high)	64	10
20-A	71	72	**See mitigation measure NOI-FB-2.**		
20-B	62	63	**None required.**	63	---
E	71	73	**New noise barrier (NB-12).** 4.9-meter-high (16-foot-high)	64	9
21	72	74	**New noise barrier (NB-12).** 4.9-meter-high (16-foot-high)	64	10

Table 4.9-7 (continued)
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
FULL BUILD ALTERNATIVE

Site ID No.	**Existing Modeled Noise Level** in Leq(h), dBA	**Predicted Noise Level Without Abatement** in Leq(h), dBA	**Abatement** *(Noise barriers numbers cross-reference to Figure 4.9-1)*	**Predicted Noise Level With Abate-ment** in Leq(h), dBA	**Noise Reduction** in dBA
Excelsior Elem. School Playground	70	72	**New noise barrier (NB-12).** 4.9-meter-high (16-foot-high)	64	8
21-A	72	74	**New noise barrier (NB-12).** 4.9-meter-high (16-foot-high)	66	8
22	68	*Not applicable; receiver would not exist under Full Build Alternative*			
22-A	65	72	**New noise barrier (NB-13).** 4.9-meter-high (16-foot-high)	65	7
22-B	70	*Not applicable; receiver would not exist under Full Build Alternative*			

23	66	68	**New noise barrier (NB-14).** 4.9-meter-high (16-foot-high) *(Although this noise barrier not feasible for this receiver site, it is feasible for other sites in the same area, such as 23-A.)*	67	1
23-A	72	73	**New noise barrier (NB-14).** 4.9-meter-high (16-foot-high)	65	8
24	66	68	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	68	---
25	67	70	**None.** Existing 3.0-meter (10-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	70	---
F	66	69	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	69	---
Eisenhower Elem. School Playground	66	69	**None.** Existing 3.0-meter (10-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	69	---
26	66	68	**None.** Existing 3.0-meter (10-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	68	---
27	66	68	**New noise barrier (NB-16).** 4.9-meter-high (16-foot-high) *(Although this noise barrier not feasible for this receiver site, it is feasible for other sites in the same area, such as 27-A.)*	64	4
27-A	73	76	**New noise barrier (NB-16).** 4.9-meter-high (16-foot-high)	69	7
27-B	72	75	**New noise barrier (NB-15).** 4.9-meter-high (16-foot-high)	67	8

Table 4.9-7 (continued)
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
FULL BUILD ALTERNATIVE

Site ID No.	**Existing Modeled Noise Level** in Leq(h), dBA	**Predicted Noise Level Without Abatement** in Leq(h), dBA	**Abatement** *(Noise barriers numbers cross-reference to Figure 4.9-1)*	**Predicted Noise Level With Abatement** in Leq(h), dBA	**Noise Reduction** in dBA
G	63	73	**New noise barrier (NB-17).** 4.9-meter-high (16-foot-high)	66	7
G-A	64	*Not applicable; receiver would not exist under Full Build Alternative*			
28	65	*Not applicable; receiver would not exist under Full Build Alternative*			
28-A	68	69	**New noise barrier (NB-18).** 4.9-meter-high (16-foot-high)	62	7
28-B	65	70	**New noise barrier (NB-18).** 4.9-meter-high (16-foot-high) Also, existing 4.3-meter (14-foot) noise barrier will remain.	65	5

28-C	61	69	**New noise barrier (NB-18).** 4.9-meter-high (16-foot-high)	63	6
29	67	68	**None.** Existing 3.7- to 4.3-meter (12- to 14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	68	---
29-A	69	70	**New noise barrier (NB-19).** 4.9-meter-high (16-foot-high)	62	8
29-B	63	65	**None required.** Existing 3.7- to 4.3-meter (12- to 14-foot) noise barrier will remain.	65	---
29-C	67	72	**New noise barrier (NB-20).** 4.9-meter-high (16-foot-high)	64	8
29-D	69	70	**New noise barrier (NB-21).** 4.9-meter-high (16-foot-high)	61	9
30	67	68	**New noise barrier (NB-21).** 4.9-meter-high (16-foot-high)	62	6
30-A	68	70	**New noise barrier (NB-22).** 4.9-meter-high (16-foot-high)	65	5
H	63	65	**None required.** Existing 3.7-meter (12-foot) noise barrier will remain.	65	---
31	66	67	**New noise barrier (NB-23).** 4.9-meter-high (16-foot-high)	59	8
31-A	69	70	**None.** Existing 3.7-meter (12-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	70	---
31-B	73	75	**New noise barrier (NB-23).** 4.9-meter-high (16-foot-high)	64	11
I	70	70	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	70	---
32	67	67	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	67	---
32-A	68	68	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	68	---

Table 4.9-7 (continued)
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
FULL BUILD ALTERNATIVE

Site ID No.	Existing Modeled Noise Level in Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement *(Noise barriers numbers cross-reference to Figure 4.9-1)*	Predicted Noise Level With Abate-ment in Leq(h), dBA	Noise Reduction in dBA
J	65	65	**None required.** Existing 3.7- to 4.3-meter (12- to 14-foot) noise barrier will remain.	65	---
33	51	75	**New noise barrier (NB-24).** 4.9-meter-high (16-foot-high)	62	13
33-A	51	70	**New noise barrier (NB-25).** 4.9-meter-high (16-foot-high)	58	12
Willowick Muni. Golf Course	51	70	**New noise barrier (NB-25).** 4.9-meter-high (16-foot-high)	60	10
Spurgeon Intermed. School Playground	56	65	**None required.**	65	---
34	56	66	**None proposed.** Noise barrier (NB-26) not reasonable.	66	---

NOI-FB-2. At the three commercial land uses with outdoor activities where noise levels with the Full Build Alternative would exceed the NAC for commercial uses (Sites 18-A, 19-A, and 20-A), modeling analysis shows that a 4.3- or 4.9-meter-high (14- or 16-foot-high) noise barrier would be feasible because it would reduce noise levels at these locations by at least five dBA. Although noise barriers are not usually provided for commercial land uses, Caltrans will consult with the property owners at these locations to determine their desire for noise barriers. Noise barriers will not be provided unless commercial property owners at these locations request them.

NOI-FB-3. Noise abatement at schools is shown in Table 4.9-8. At Jordan Intermediate School, predicted interior traffic noise levels at the closest school building to SR-22 would be 61 dBA and would be reduced to 56 dBA with the proposed noise abatement (NB-11). The school buildings are not air-conditioned; therefore, the expected interior noise levels would exceed the NAC of 52 dBA at the closest building. This school is a large campus with many buildings that, because of their location, provide additional noise reduction in the form of shielding to other buildings on campus. Further study will be conducted to determine if after the construction of NB-11, additional noise abatement is required for the school's classrooms. This abatement could take the form of air-conditioning to those classrooms that would be impacted to allow windows to be closed when those rooms are used. After abatement, noise levels will be below 51 dBA at the closest school building to SR-22.

At Excelsior Elementary School, predicted interior traffic noise levels at the closest school building to SR-22 would be 58 dBA and would be reduced to 51 dBA with the proposed noise abatement (NB-12). The school buildings are not air-conditioned; therefore, the expected interior noise levels would approach (come within one dBA of) the NAC of 52 dBA at the closest building. Further study will be conducted to determine if after the construction of NB-12, additional noise abatement is required for the school's classrooms. This abatement could take the form of air-conditioning to those classrooms that would be impacted to allow windows to be closed when those rooms are used. After abatement, noise levels will be below 51 dBA at the closest school building to SR-22.

Table 4.9-8
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS AT SCHOOL INTERIORS
FULL BUILD ALTERNATIVE

Site ID No.	Existing Modeled Noise Level in Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement *(Noise barriers numbers cross-reference to Figure 4.9-1)*	Predicted Noise Level With Abatement in Leq(h), dBA	Noise Reduction in dBA
Bolsa Grande High School Bldg. Interior (not air-conditioned)	50	55	**New noise barrier (NB-11).** 4.9-meter-high (16-foot-high)	50	5
Jordan Intermed. School Bldg. Interior (not air-conditioned)	59	61	**New noise barrier (NB-11).** 4.9-meter-high (16-foot-high)	56	5
Excelsior Elem. School Bldg. Interior (not air-conditioned)	56	58	**New noise barrier (NB-12).** 4.9-meter-high (16-foot-high)	51	7
Eisenhower Elem. School Bldg. Interior (air-conditioned)	47	50	**None required.** Existing 3.0-meter (10-foot) noise barrier will remain.	50	---
Fairhaven Elem. School Bldg. Interior (air-conditioned)	49	50	**None required.** **New noise barrier (NB-23).** 4.9-meter-high (16-foot-high) *(Although this noise barrier not required or feasible for this receiver site, it will be provided for other sites in the same area, such as 31 and 31-B.)*	46	4
Spurgeon Intermed. School Bldg. Interior (air-conditioned)	< 43	43	**None required.**	43	---

NOI-FB-4. Multiple reflections between reflective parallel noise barriers (noise barriers on each side of a roadway) can potentially reduce the acoustical performance of each individual barrier. How much degradation takes place depends on the final site geometry and barrier configurations. An important relationship is the ratio of the separation between two parallel barriers (W) and their average height (H-Average). As a general rule, if the W/H-Average ratio is 10:1 or greater, the insertion loss degradation is less than three dBA, and not noticeable to the human ear. Assuming the maximum noise barrier height of 4.9 meters (16 feet), the width separating each of the parallel noise barriers on this project would be greater then 10:1 throughout the Full Build Alternative, with the exception of along the Pacific Electric Arterial, where NB-24 and NB-25 are parallel. Additional study will be required during final design to determine how to mitigate the potential performance degradation of parallel noise barriers NB-24 and NB-25. Measures to reduce the sound reflections between these two parallel barriers could include providing a sound absorptive finish to the traffic side of each barrier.

Construction Noise Abatement/Mitigation.

NOI-FB-5. The contractor will comply with the noise ordinances of County of Orange and the Cities of Los Alamitos, Seal Beach, Westminster, Garden Grove, Santa Ana, Orange, and Tustin. These ordinances regulate the level of noise that may be generated as a result of construction activity. The specific requirements of these noise ordinances, which primarily regulate the hours of the day when construction activity is allowed, are listed in Table 4.9-9.

Table 4.9-9
LOCAL NOISE ORDINANCE CONSTRUCTION ABATEMENT/MITIGATION

City	Noise Abatement/Mitigation Measures
Los Alamitos	Construction limited to the hours of 7 a.m. to 8 p.m., Monday through Saturday. No construction allowed on Sundays and holidays.
Seal Beach	Construction limited to the hours of 7 a.m. to 8 p.m., Monday through Saturday. No construction allowed on Sundays and holidays.
Westminster	Construction limited to the hours of 7 a.m. to 8 p.m., Monday through Saturday. No construction allowed on Sundays and holidays.
Garden Grove	Construction limited to the hours of 7 a.m. to 8 p.m., Monday through Saturday. No construction allowed on Sundays and federal holidays.
Orange	Construction limited to the hours of 7 a.m. to 8 p.m., Monday through Saturday. No construction allowed on Sundays and federal holidays.
Santa Ana	Construction limited to the hours of 7 a.m. to 8 p.m., Monday through Saturday. No construction allowed on Sundays and holidays.
Tustin	Construction limited to the hours of 7 a.m. to 6 p.m., Monday through Friday; 9 a.m. to 5 p.m., Saturday. No construction allowed on Sundays and holidays.
Orange County and Rossmoor	Construction limited to the hours of 7 a.m. to 8 p.m., Monday through Saturday. No construction allowed on Sundays and federal holidays.

NOI-FB-6. During the early stages of a site-specific construction plan development, consider existing natural and artificial barriers, such as ground elevation changes and existing buildings, for use as shielding against construction noise.

NOI-FB-7. Noise barriers and noise barrier additions required for long-term noise abatement/mitigation will be constructed during the initial stages, where feasible, to reduce the impacts of construction noise.

NOI-FB-8. In areas where pile driving and similar activities would occur in close proximity to noise-sensitive land uses, alternate methods of construction will be used, where feasible. For pile driving, possible alternate methods include vibration or hydraulic insertion of piles or drilled holes for cast-in-place piles.

NOI-FB-9. The contractor shall comply with Caltrans' Standard Specifications, "Sound Control Requirements," and all local sound-control and noise level rules, regulations, and ordinances that apply.

NOI-FB-10. Each internal combustion engine, used for any purpose on the construction of the project or related to the project, will be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without such a muffler.

NOI-FB-11. Community meetings will be held to explain to the area residents about the construction work, time involved, and the control measures to be taken to reduce the impact of the construction noise.

D. REDUCED BUILD ALTERNATIVE

Traffic Noise Abatement – Preliminary Noise Abatement Decision.

NOI-RB-1. Based on the Preliminary Noise Abatement Analysis (Appendix I.3), noise barriers are proposed for the Reduced Build Alternative, as shown in Figure 4.9-2 (at the end of this section) and Table 4.9-10. All 20 noise barriers considered for abatement were found to be reasonable (see Table B, Appendix I.3). These noise barriers are the highest that are considered to be feasible and reasonable. As shown in Table 4.9-10, each of these noise barriers would result in at least a five-dBA noise reduction at the critical receiver. The total allowance for the highest walls considered, (4.7 meters [16 feet]), is $38,792,000. Because this value is less than 50 percent of the total estimated project construction cost, modification of the total allowance is not required.

Table 4.9-10
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
REDUCED BUILD ALTERNATIVE

Site ID No.	**Existing Modeled Noise Level** in Leq(h), dBA	**Predicted Noise Level Without Abatement** in Leq(h), dBA	**Abatement** *(Noise barriers numbers cross-reference to Figure 4.9-1)*	**Predicted Noise Level With Abatement** in Leq(h), dBA	**Noise Reduction** in dBA
1	66	66	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	66	---
1-A	65	65	**None required.** Existing 4.3-meter (14-foot) noise barrier will remain.	65	---
A	65	67	**New noise barrier (NB-1).** 4.9-meter-high (16-foot-high)	62	5
1-B	61	62	**None required.** Existing 4.3-meter (14-foot) noise barrier will remain.	62	---
2	65	70	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	70	---
3	63	66	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	66	---
4	65	70	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	70	---
Blue Bell Park	67	69	**None.** Existing 4.9- to 5.5-meter (16- to 18-foot) noise barrier is highest available.	69	---
B	67	69	**None.** Existing 4.9- to 5.5-meter (16- to 18-foot) noise barrier is highest available.	69	---
Almond Park	68	70	**None.** Existing 4.9- to 5.5-meter (16- to 18-foot) noise barrier is highest available.	70	---
5	67	75	**New noise barrier (NB-2).** 4.9-meter-high (16-foot-high)	68	7
5-A	67	75	**New noise barrier (NB-2).** 4.9-meter-high (16-foot-high)	68	7

Table 4.9-10 (continued)
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
REDUCED BUILD ALTERNATIVE

Site ID No.	Existing Modeled Noise Level in Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement *(Noise barriers numbers cross-reference to Figure 4.9-1)*	Predicted Noise Level With Abate-ment in Leq(h), dBA	Noise Reduction in dBA
5-B	66	76	**New noise barrier (NB-2).** 4.9-meter-high (16-foot-high)	66	10
6	68	69	**New noise barrier (NB-3).** 4.9-meter-high (16-foot-high)	64	5
6-A	68	71	**New noise barrier (NB-3).** 4.9-meter-high (16-foot-high)	65	6
7	73	74	**New noise barrier (NB-5).** 4.9-meter-high (16-foot-high)	66	8
C	74	75	**New noise barrier (NB-4).** 4.9-meter-high (16-foot-high)	66	9
8	74	75	**New noise barrier (NB-4).** 4.9-meter-high (16-foot-high)	66	9
9	74	75	**New noise barrier (NB-7).** 4.9-meter-high (16-foot-high)	66	9
10	72	73	**New noise barrier (NB-6).** 4.9-meter-high (16-foot-high)	66	7
10-A	72	73	**New noise barrier (NB-6).** 4.9-meter-high (16-foot-high)	66	7
11	71	72	**New noise barrier (NB-7).** 4.9-meter-high (16-foot-high)	67	5
12	68	69	**New noise barrier (NB-8).** 4.9-meter-high (16-foot-high)	61	8
13	69	70	**New noise barrier (NB-8).** 4.9-meter-high (16-foot-high)	62	8
14	73	75	**New noise barrier (NB-9).** 4.9-meter-high (16-foot-high)	68	7
15	70	72	**New noise barrier (NB-9).** 4.9-meter-high (16-foot-high)	67	5
D	66	68	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	68	---
15-A	65	67	**New noise barrier (NB-9).** 4.9-meter-high (16-foot-high)	62	5
16	68	72	**New noise barrier (NB-10).** 4.9-meter-high (16-foot-high)	63	9
16-A	75	78	**New noise barrier (NB-9).** 4.9-meter-high (16-foot-high)	63	15
16-B	73	73	**New noise barrier (NB-9).** 4.9-meter-high (16-foot-high)	58	15
17	66	71	**New noise barrier (NB-10).** 4.9-meter-high (16-foot-high)	62	9
18	70	76	**New noise barrier (NB-11).** 4.9-meter-high (16-foot-high)	64	12
18-A	70	72	**See mitigation measure NOI-FB-2.**		
Bolsa Grande High School Playground	69	74	**New noise barrier (NB-11).** 4.9-meter-high (16-foot-high)	64	10
19	68	74	**New noise barrier (NB-11).** 4.9-meter-high (16-foot-high)	65	9
19-A	72	76	**See mitigation measure NOI-FB-2.**		
20	69	74	**New noise barrier (NB-11).** 4.9-meter-high (16-foot-high)	64	10
20-A	71	72	**See mitigation measure NOI-FB-2.**		

Table 4.9-10 (continued)
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
REDUCED BUILD ALTERNATIVE

Site ID No.	Existing Modeled Noise Level in Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement *(Noise barriers numbers cross-reference to Figure 4.9-1)*	Predicted Noise Level With Abate-ment in Leq(h), dBA	Noise Reduction in dBA
20-B	62	63	**None required.**	63	---
E	71	73	**New noise barrier (NB-12).** 4.9-meter-high (16-foot-high)	64	9
21	72	74	**New noise barrier (NB-12).** 4.9-meter-high (16-foot-high)	64	10
Excelsior Elem. School Playground	70	72	**New noise barrier (NB-12).** 4.9-meter-high (16-foot-high)	64	8
21-A	72	74	**New noise barrier (NB-12).** 4.9-meter-high (16-foot-high)	66	8
22	68	69	**New noise barrier (NB-13).** 4.9-meter-high (16-foot-high)	63	6
22-A	65	67	**New noise barrier (NB-13).** 4.9-meter-high (16-foot-high)	58	9
22-B	70	70	**New noise barrier (NB-13A).** 4.9-meter-high (16-foot-high)	62	8
23	66	68	**New noise barrier (NB-14).** 4.9-meter-high (16-foot-high) *(Although this noise barrier not feasible for this receiver site, it is feasible for other sites in the same area, such as 23-A.)*	67	1
23-A	72	73	**New noise barrier (NB-14).** 4.9-meter-high (16-foot-high)	65	8
24	66	68	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	68	---
25	67	70	**None.** Existing 3.0-meter (10-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	70	---
F	66	69	**None.** Existing 4.3-meter (14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	69	---
Eisenhower Elem. School Playground	66	69	**None.** Existing 3.0-meter (10-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	69	---
26	66	68	**None.** Existing 3.0-meter (10-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	68	---
27	66	68	**New noise barrier (NB-16).** 4.9-meter-high (16-foot-high) *(Although this noise barrier not feasible for this receiver site, it is feasible for other sites in the same area, such as 27-A.)*	64	4
27-A	73	76	**New noise barrier (NB-16).** 4.9-meter-high (16-foot-high)	69	7
27-B	72	75	**New noise barrier (NB-15).** 4.9-meter-high (16-foot-high)	67	8

Table 4.9-10 (continued)
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS
REDUCED BUILD ALTERNATIVE

Site ID No.	Existing Modeled Noise Level in Leq(h), dBA	Predicted Noise Level Without Abatement in Leq(h), dBA	Abatement *(Noise barriers numbers cross-reference to Figure 4.9-1)*	Predicted Noise Level With Abatement in Leq(h), dBA	Noise Reduction in dBA
G	63	66	**None.** Existing 4.3-meter (14-foot) non-state wall will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	66	---
G-A	64	67	**None.** Existing 4.3-meter (14-foot) non-state wall will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	67	---
28	65	73	**New noise barrier (NB-18).** 4.9-meter-high (16-foot-high)	64	9
28-A	68	70	**New noise barrier (NB-18).** 4.9-meter-high (16-foot-high)	65	5
28-B	65	69	**New noise barrier (NB-18).** 4.9-meter-high (16-foot-high) Also, existing 4.3-meter (14-foot) noise barrier will remain.	65	4
28-C	61	68	**New noise barrier (NB-18).** 4.9-meter-high (16-foot-high)	60	8
29	67	68	**None.** Existing 3.7- to 4.3-meter (12- to 14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	68	---
29-A	69	70	**New noise barrier (NB-19).** 4.9-meter-high (16-foot-high)	62	8
29-B	63	64	**None.** Existing 3.7- to 4.3-meter (12- to 14-foot) noise barrier will remain. Highest available noise barrier not feasible (will not reduce by at least 5 dBA).	64	---
29-C	67	72	**New noise barrier (NB-20).** 4.9-meter-high (16-foot-high)	64	8
29-D	69	70	**New noise barrier (NB-20).** 4.9-meter-high (16-foot-high)	61	9
30	67	68	**New noise barrier (NB-21).** 4.9-meter-high (16-foot-high)	62	6
30-A	68	*Outside project limits for Reduced Build Alternative.*			
31	66				
H	63				
31-A	69				
31-B	73				
I	70				
32	67				
32-A	68				
J	65				
33	51				
33-A	51				
Willowick Muni. Golf Course	51				
Spurgeon Intermed. School Playground	56				
34	56				

NOI-RB-2. At the three commercial land uses with outdoor activities where noise levels with the Full Build Alternative would exceed the NAC for commercial uses (Sites 18-A, 19-A, and 20-A), modeling analysis shows that a 4.3- or 4.9-meter-high (14- or 16-foot-high) noise barrier would be feasible because it would reduce noise levels at these locations by at least five dBA. Although noise barriers are not usually provided for commercial land uses, Caltrans will consult with the property owners at these locations to determine their desire for noise barriers. Noise barriers will not be provided unless commercial property owners at these locations request them.

NOI-RB-3. Noise abatement at schools is shown in Table 4.9-11. At Jordan Intermediate School, predicted interior traffic noise levels at the closest school building to SR-22 would be 61 dBA and would be reduced to 56 dBA with the proposed noise abatement (NB-11). The school buildings are not air-conditioned; therefore, the expected interior noise levels would exceed the NAC of 52 dBA at the closest building. This school is a large campus with many buildings that, because of their location, provide additional noise reduction in the form of shielding to other buildings on campus. Further study will be conducted to determine if after the construction of NB-11, additional noise abatement is required for the school's classrooms. This abatement could take the form of air-conditioning to those classrooms that would be impacted to allow windows to be closed when those rooms are used. After abatement, noise levels will be below 51 dBA at the closest school building to SR-22.

Table 4.9-11
EXISTING, PREDICTED, AND ABATED FUTURE NOISE LEVELS AT SCHOOL INTERIORS
REDUCED BUILD ALTERNATIVE

Site ID No.	**Existing Modeled Noise Level** in Leq(h), dBA	**Predicted Noise Level Without Abatement** in Leq(h), dBA	**Abatement** *(Noise barriers numbers cross-reference to Figure 4.9-1)*	**Predicted Noise Level With Abatement** in Leq(h), dBA	**Noise Reduction** in dBA
Bolsa Grande High School Bldg. Interior (not air-conditioned)	50	55	**New noise barrier (NB-11).** 4.9-meter-high (16-foot-high)	50	5
Jordan Intermed. School Bldg. Interior (not air-conditioned)	59	61	**New noise barrier (NB-11).** 4.9-meter-high (16-foot-high)	56	5
Excelsior Elem. School Bldg. Interior (not air-conditioned)	56	58	**New noise barrier (NB-12).** 4.9-meter-high (16-foot-high)	51	7
Eisenhower Elem. School Bldg. Interior (air-conditioned)	47	50	**None required.** Existing 3.0-meter (10-foot) noise barrier will remain.	50	---
Fairhaven Elem. School Bldg. Interior (air-conditioned)	49	*Outside project limits for Reduced Build Alternative.*			
Spurgeon Intermed. School Bldg. Interior (air-conditioned)	< 43				

At Excelsior Elementary School, predicted interior traffic noise levels at the closest school building to SR-22 would be 58 dBA and would be reduced to 51 dBA with the proposed noise abatement

(NB-12). The school buildings are not air-conditioned; therefore, the expected interior noise levels would approach (come within one dBA of) the NAC of 52 dBA at the closest building. Further study will be conducted to determine if after the construction of NB-12, additional noise abatement is required for the school's classrooms. This abatement could take the form of air-conditioning to those classrooms that would be impacted to allow windows to be closed when those rooms are used. After abatement, noise levels will be below 51 dBA at the closest school building to SR-22.

Construction Noise Abatement/Mitigation.

NOI-RB-4. The contractor will comply with the noise ordinances of County of Orange and the Cities of Los Alamitos, Seal Beach, Westminster, Garden Grove, Santa Ana, and Orange. These ordinances regulate the level of noise that may be generated as a result of construction activity. The specific requirements of these noise ordinances, which primarily regulate the hours of the day when construction activity is allowed, are listed in Table 4.9-9.

NOI-RB-5. During the early stages of a site-specific construction plan development, consider existing natural and artificial barriers, such as ground elevation changes and existing buildings, for use as shielding against construction noise.

NOI-RB-6. Noise barriers and noise barrier additions required for long-term noise abatement/mitigation will be constructed during the initial stages, where feasible, to reduce the impacts of construction noise.

NOI-RB-7. In areas where pile driving and similar activities would occur in close proximity to noise-sensitive land uses, alternate methods of construction, will be used, where feasible. For pile driving, possible alternate methods include vibration or hydraulic insertion of piles or drilled holes for cast-in-place piles.

NOI-RB-8. The contractor shall comply with Caltrans' Standard Specifications, "Sound Control Requirements," and all local sound-control and noise level rules, regulations, and ordinances that apply.

NOI-RB-9. Each internal combustion engine, used for any purpose on the construction of the project or related to the project, will be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without such a muffler.

NOI-RB-10. Community meetings will be held to explain to the area residents about the construction work, time involved, and the control measures to be taken to reduce the impact of the construction noise.

4.9.5 Residual Impacts After Noise Abatement/Mitigation

Residual impacts after noise abatement/mitigation are those that would remain either because no abatement is proposed for a substantial impact or because the impacts would not be mitigated to less than substantial by the proposed abatement. There would be no impacts that cannot be fully mitigated to less than substantial, as defined by Caltrans (i.e., a 12 dBA increase).

A. NO BUILD ALTERNATIVE

Since there are existing conditions (No Build Alternative conditions) that exceed the FHWA NAC and no abatement is proposed for the No Build Alternative beyond the existing Community Noise Abatement program, these existing impacts would remain. Because the No Build Alternative would not result in a 12-dBA increase in noise, no residual noise impact would occur, as defined by Caltrans.

B. TSM/EXPANDED BUS SERVICE ALTERNATIVE

Because there are existing conditions that exceed the FHWA NAC and that would not be improved under the TSM/Expanded Bus Service Alternative beyond the existing Community Noise Abatement program, and because no abatement is proposed, these existing impacts would remain. Because the TSM/Expanded Bus Service Alternative would not result in a 12-dBA increase in noise, no residual noise impact would occur, as defined by Caltrans.

C. FULL BUILD ALTERNATIVE

Under CEQA, a project would have a significant effect on the environment if it would increase substantially the ambient noise levels (CEQA Guidelines) for adjoining areas, which is defined by Caltrans as an increase of 12 dBA. There would be no locations where a 12-dBA increase would remain after abatement, so minimal residual noise impact would remain under the Full Build Alternative.

The federal and state noise abatement criterion of 67 dBA for category B uses would be approached or exceeded after abatement (as specified in Table 4.9-7) at 36 receivers for the Full Build Alternative. At 19 of these, there would be an increase in the noise levels that is attributable to the Full Build Alternative that will not or cannot be fully abated to less than or equal to the existing noise levels. (At 17 additional sites, noise levels after abatement would be above the NAC, but these levels would be at or below the existing level, so all impacts resulting from the Full Build Alternative would be fully abated.) Thus, residual noise levels after abatement resulting from the Full Build Alternative would occur at 19 category B receivers, but none of these would represent a substantial residual noise impact, as defined by Caltrans.

The federal and state noise abatement criterion of 72 dBA for category C uses would be approached or exceeded at three commercial sites with outdoor use areas. Whether abatement will be constructed or not depends on the desires of the commercial property owners. Thus, residual noise levels after abatement resulting from the Full Build Alternative may occur at these three category C receivers, but none of these would represent a substantial residual noise impact, as defined by Caltrans.

Category E receivers (school interiors) would not experience residual noise levels after abatement and additional abatement proposed herein.

A final noise abatement analysis will be conducted during final design to reevaluate sensitive receptors where predicted noise would increase 12 or more decibels over ambient or where noise levels would approach or exceed the category B NAC (i.e., 66 dBA or greater). A final decision on the installation of noise abatement measures will be made upon completion of the project design and the public involvement process. Decisions on final design will be consistent with the latest FHWA/Caltrans criteria (23 CFR Part 772) and state noise policies at the time the project is advertised for construction. If additional significant noise impacts would occur, as defined by CEQA, supplemental documentation would be required.

Construction noise is only considered to be substantial in exceptional cases, such as pile driving and crack and seat pavement rehabilitation operations. Otherwise, Caltrans' Standard Specifications (Section 7 and 42) and Standard Special Provisions provide limits on construction noise levels, with normal construction noise levels not exceeding 86 dBA at a distance of 15 meters (50 feet). The Full Build Alternative may require pile driving and/or crack and seat pavement rehabilitation, and substantial short-term impacts would occur.

D. REDUCED BUILD ALTERNATIVE

Under CEQA, a project would have a significant effect on the environment if it would increase substantially the ambient noise levels (CEQA Guidelines) for adjoining areas, which is defined by

Caltrans as an increase of 12 dBA. There would be no locations where a 12-dBA increase would remain after abatement, hence, residual noise impact would remain minimal for the Reduced Build Alternative.

The federal and state noise abatement criterion of 67 dBA for category B uses would be approached or exceeded after abatement (as specified in Table 4.9-7) at 32 receivers for the Reduced Build Alternative. At 18 of these, there would be an increase in the noise levels that is attributable to the Reduced Build Alternative that will not or cannot be fully abated to less than or equal to the existing noise levels. (At 14 additional sites, noise levels after abatement would be above the NAC, but these levels would be at or below the existing level, so all impacts resulting from the Reduced Build Alternative would be fully abated.) Thus, residual noise levels after abatement resulting from the Reduced Build Alternative would occur at 18 category B receivers, but none of these would represent a substantial residual noise impact, as defined by Caltrans.

The federal and state noise abatement criterion of 72 for category C uses would be approached or exceeded at three commercial sites with outdoor use areas. Whether abatement will be constructed or not depends on the desires of the commercial property owners. Thus, residual noise levels after abatement resulting from the Reduced Build Alternative may occur at these three category C receivers, but none of these would represent a substantial residual noise impact, as defined by Caltrans.

Category E receivers (school interiors) would not experience residual noise levels after abatement and additional mitigation proposed herein.

A final noise abatement analysis will be conducted during final design to reevaluate sensitive receptors where predicted noise would increase 12 or more decibels over ambient or where noise levels would approach or exceed the category B NAC (i.e., 66 dBA or greater). A final decision on the installation of noise abatement measures will be made upon completion of the project design and the public involvement process. Decisions on final design will be consistent with the latest FHWA criteria (23 CFR Part 772) and state noise policies at the time the project is advertised for construction. If additional significant noise impacts would occur, as defined by CEQA, supplemental documentation would be required.

Construction noise is only considered to be substantial in exceptional cases, such as pile driving and crack and seat pavement rehabilitation operations. Otherwise, Caltrans' Standard Specifications (Section 7 and 42) and Standard Special Provisions provide limits on construction noise levels, with normal construction noise levels not exceeding 86 dBA at a distance of 15 meters (50 feet). The Reduced Build Alternative may require pile driving and/or crack and seat pavement rehabilitation, and substantial short-term impacts would occur.

Figure 4.9-1A, B, C, D, . . .
Full Build Alternative Noise Barriers

Figure 4.9-2A, B, C, D, . . .
Reduced Build Alternative Noise Barriers